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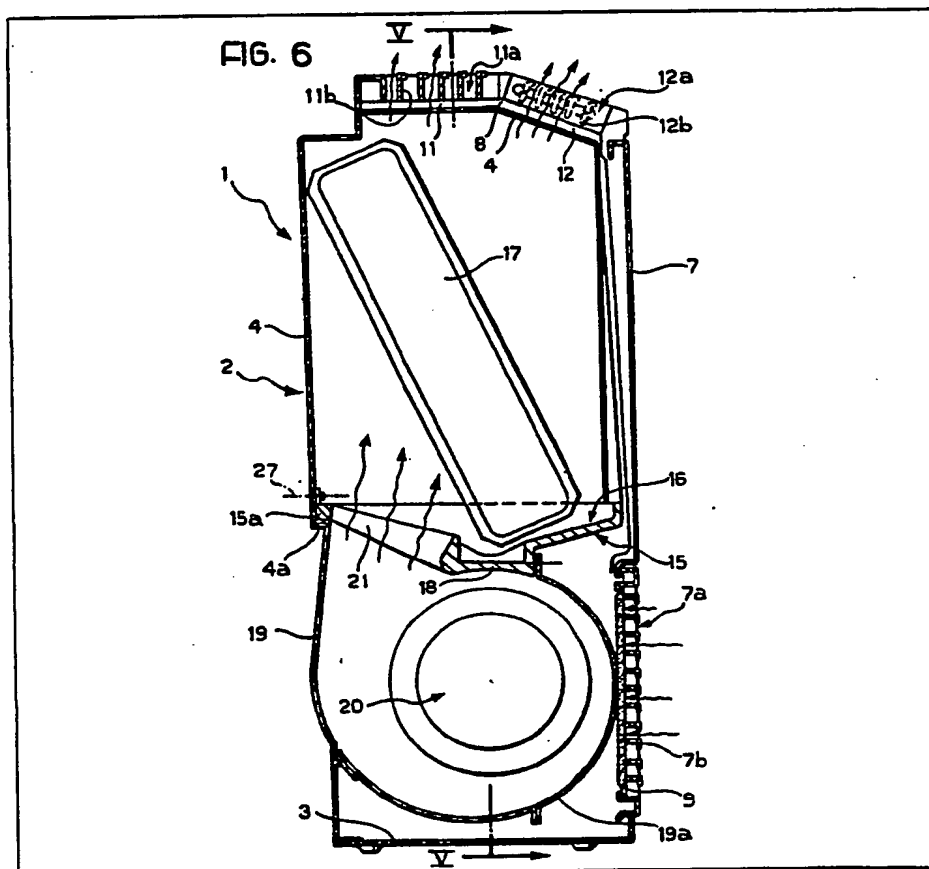
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(54) Convector fan unit

(57) A convector fan unit (1) for the treatment of air in domestic and like environments has a heat exchanger (17) and a fan (20) contained within a housing (2) and separated by a structural reinforcing partition (15). The partition has a trough (16) for collecting condensed water in the upright position of use of the unit, and on its underside it has an arcuate surface portion (18) which forms part of the fan volute, the fan delivery outlet (21) being also provided in the partition.

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The drawings originally filed were informal and the print here reproduced is taken from a later filed formal copy.

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FIG. 1

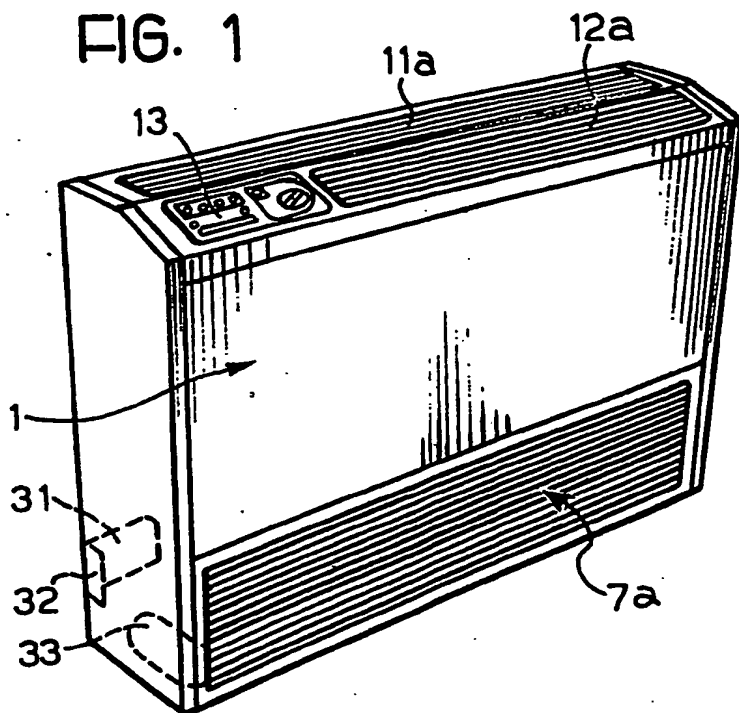


FIG. 2

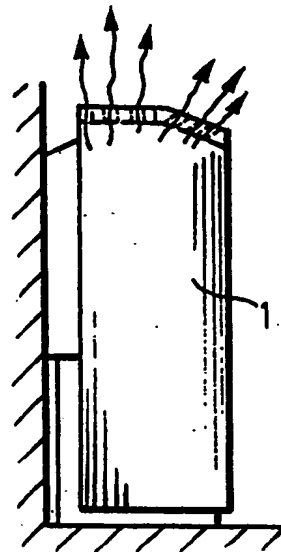


FIG. 4

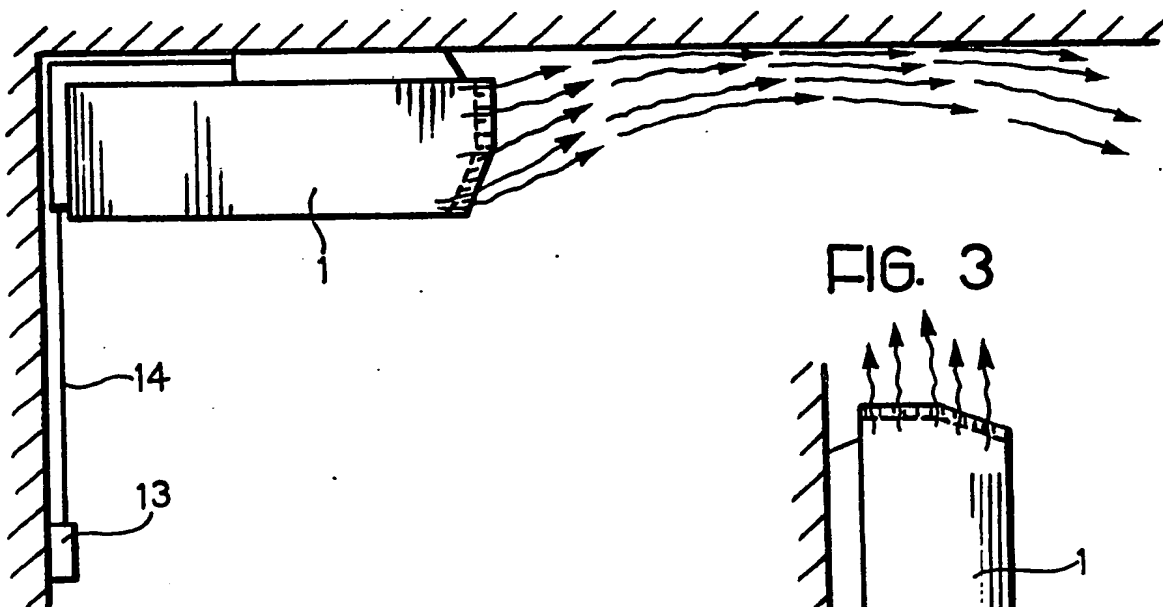
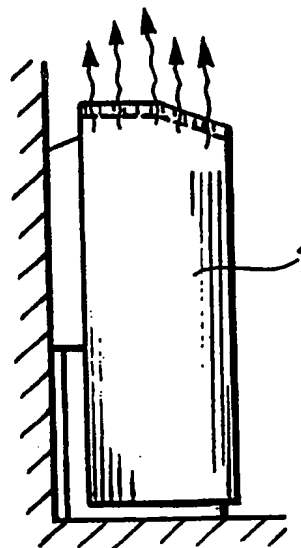


FIG. 3



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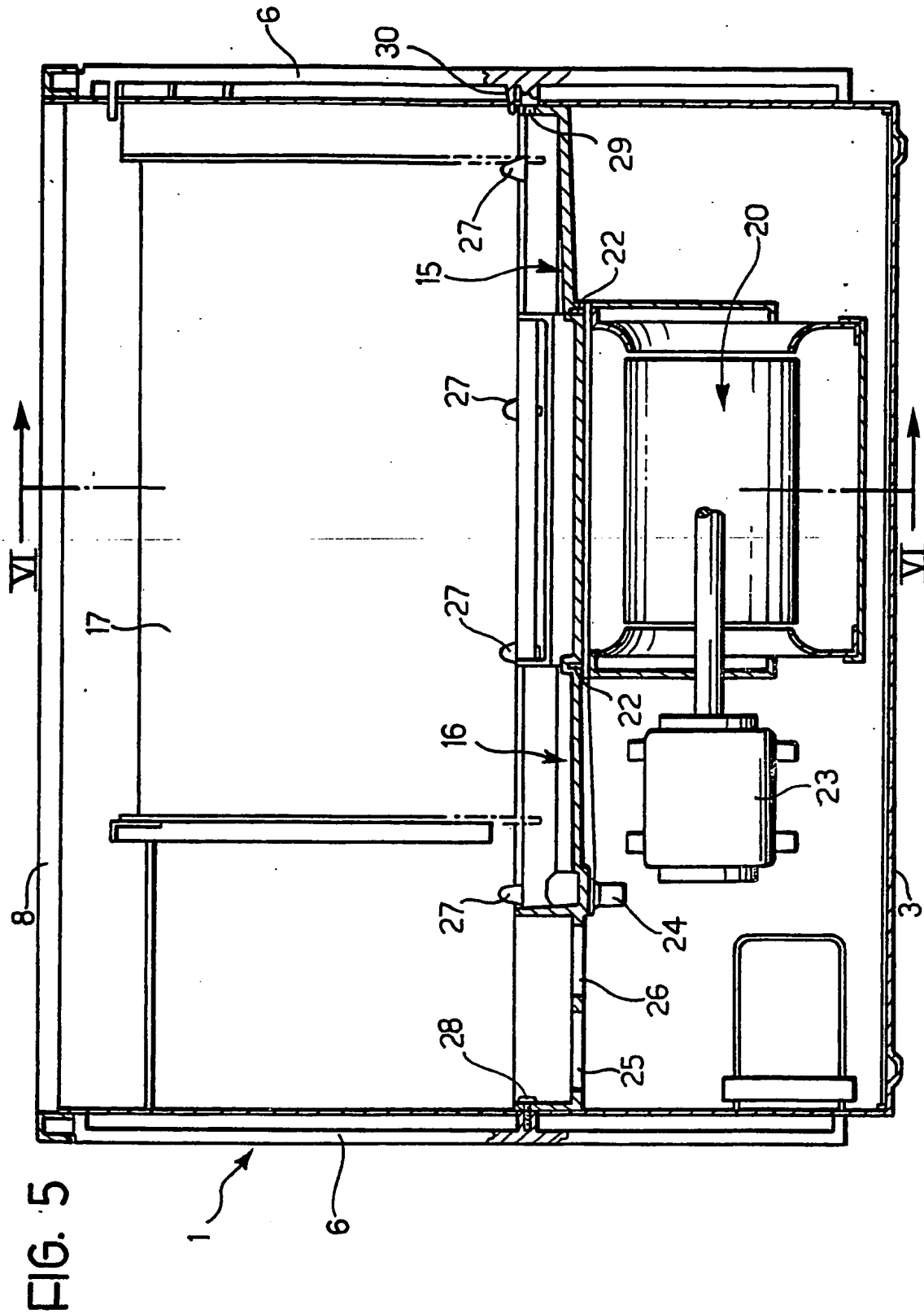
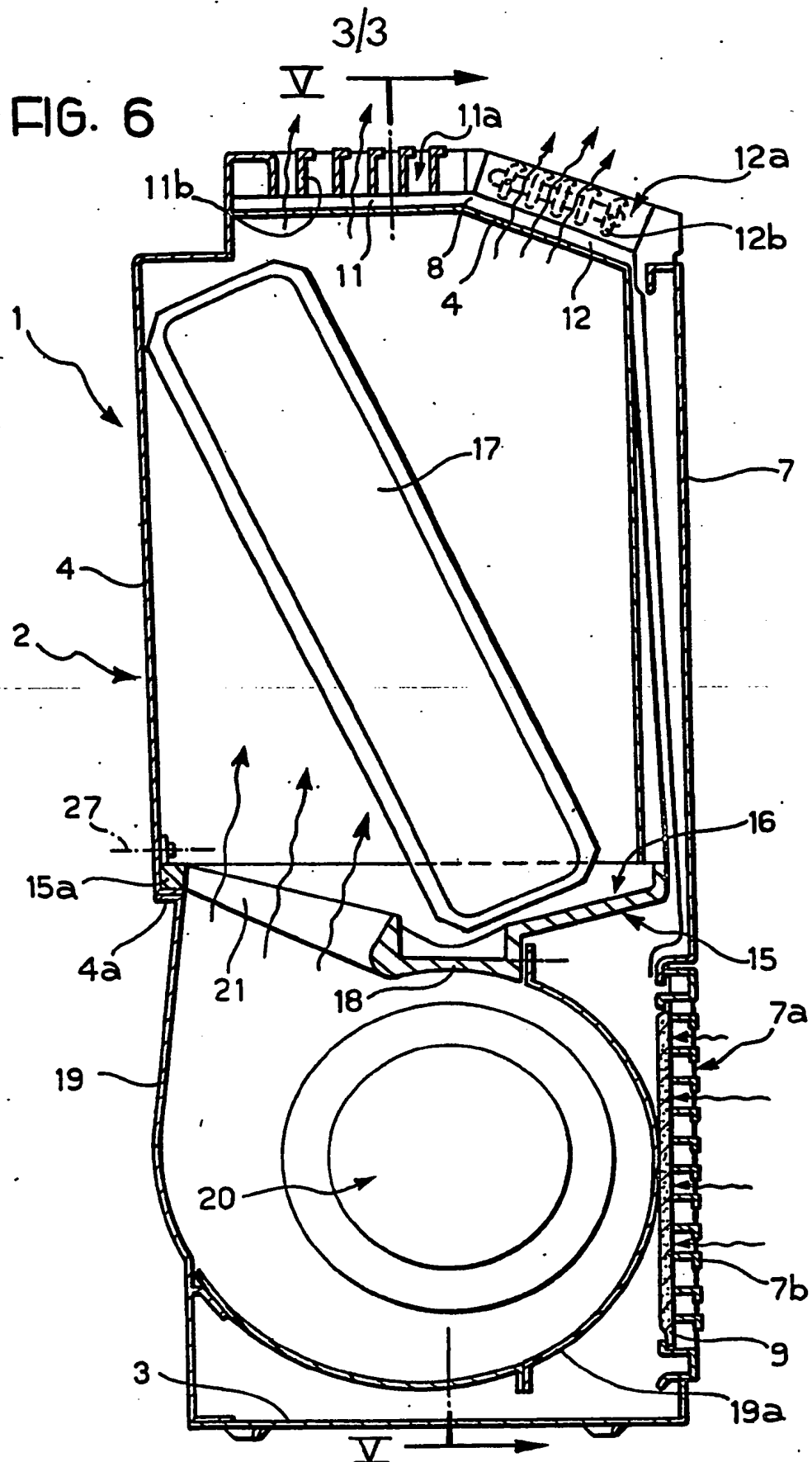


FIG. 5



SPECIFICATION

Convector fan unit

- 5 The present invention relates to a convector fan unit for treating the air in domestic, office and the like environments.

- Known convector fan units for this purpose are widely used, and although they are generally satisfactory, they have several practical disadvantages which limit their use. Thus such fan units are generally of considerable size so that they are sometimes difficult to install. In addition such fan units pose a number of problems as regards routine maintenance, for example, inspection and cleaning of the fan.

- An object of the present invention is to provide a convector fan unit of improved construction which is generally compact and easy to maintain.

- According to the present invention there is provided a convector fan unit for treating air in domestic, office and like environments, comprising a housing containing a heat exchanger and a fan, and a structurally reinforcing partition within the housing between the heat exchanger and the fan, the surface of the partition facing the heat exchanger being formed with a trough for collecting condensed water from the heat exchanger when the housing is upright, and the opposite side of the partition having an arcuate shaped portion forming part of a volute of the fan, said partition further defining the delivery outlet of the fan.

The invention will be further described, by way of example, with reference to the appended drawings, in which:

- 40 *Figure 1* is a perspective view of a convector fan unit according to one embodiment of the invention;

- Figures 2 and 3* are schematic side views of the convector fan unit of *Fig. 1* when installed in an upright position on a floor, in two different respective operational conditions;

Figure 4 is a schematic side view of the convector fan unit of *Fig. 1* when installed directly beneath a ceiling;

- 50 *Figure 5* is a longitudinal vertical section of the convector fan unit of *Fig. 1*, taken on line V-V in *Fig. 6*, and

- Figure 6* is a transverse cross sectional view of the convector fan unit of *Fig. 1*, taken on line VI-VI in *Fig. 5*.

- With reference to the drawings, a convector fan unit according to the invention is generally indicated by reference numeral 1. The fan unit 1 includes a housing 2 of substantially parallelepiped shape having a bottom wall 3 and a rear wall 4 of sheet metal, two side walls 5 and 6 of plastics material and a front wall 7 and an upper wall 8 formed, at least in part, by grilles. The bottom and rear 3 and 4 constitute a monolithic framework to which

the side walls 5 and 6, and the walls 7 and 8, are fixed.

- The lower part of the front wall 7 is formed with an air inlet aperture 7a provided with a grille 7b and a filter 9.

- The upper wall 8 is formed in two longitudinally extending sections 11 and 12 arranged side-by-side, of which the section 11 is flat and horizontal in the upright position of the unit (Figs. 2 and 3) and the section 12 is inclined at a small angle to the horizontal. The sections 11 and 12 are provided with respective outlet apertures 11a and 12a for the treated air, equipped with respective grilles 11b and 12b. The grille 11b comprises fixed longitudinally extending parallel vanes while the grille 12b is made up of parallel longitudinally extending vanes which can be swivelled about longitudinal axes to direct the air outflow through the aperture 12a.

- A control box 13 is releasably mounted in a recess in the upper wall 8 and is connected by cables 14 to the fan drive motor. The length of these cables 14 is so chosen that when the convector fan unit 1 is installed directly beneath a ceiling the control box 13 can be removed from its recess and mounted separately from the housing 2, within arms reach, as shown in *Figure 4*.

- A partition 15 extends horizontally within the housing 2 (in the upright position of the latter) at a distance of about half the height of the housing from the bottom wall 3. The partition 15 is fixed to the side walls 4, 5 and 6 and is made of plastics material of a sufficient mechanical strength to support components of the fan. For example, the partition 15 may be made of semi-expanded polystyrene, of the so-called structural type, is formed, for example, by injection moulding.

- The upper side of the partition 15 is formed with a shallow trough 16 located beneath a heat exchanger 17 disposed within the housing 2 so as to collect condensed water therefrom in the upright position of the housing 2.

- The under side of the partition 15 is shaped with an arcuate portion 18 (*Fig. 6*) which forms a smooth continuation of a volute 19 of a fan 20 located in the housing 2 below the partition 15, the said volute 19 having a front portion 19a which is removable for access to the fan 20 from the front.

- Adjacent the portion 18 the partition 15 is formed with a delivery opening 21 which receives the air delivered by the fan 20.

- The fan 20 is releasably fixed beneath the partition 15 by fixing elements 22 and is driven by a motor 23.

- In operation of the unit air is drawn by the fan 20 through the air inlet aperture 7a and is directed through the delivery opening 21 towards the outlet apertures 11a and 12a, passing over the heat exchanger 17. The heat exchanger 17 may perform a cooling function when the fan unit 1 is used as an air condi-

tion: may perform a heating function when the fan unit 1 is used as an air heater.

The partition 15 is provided with a drain outlet 24 for draining condensed water from the trough 16. The partition 15 is further formed with two through holes 25 and 26, in which respective connectors (not shown) may be fixed for connection to supply pipes (not shown) for conducting heat exchanger fluid to and from the exchanger 17.

The fixing of the partition 15 to the walls 4, 5 and 6 of the housing 2 is effected by the means described below. Specifically, the partition 15 has a rear edge 15a which rests on a corresponding step 4a of the wall 4 to which the edge 15a is fixed by screws 27. The partition 15 is fixed to the side walls 5 and 6 by means of screws 28 and located by means of locating pins 29. An inwardly projecting flange 30 on the side wall 6 forms a lip for guiding the condensed water into the trough 16.

The housing 2 has closable apertures in the rear wall 4, the side wall 5 and the lower wall 3 respectively which can be used alternatively for the passage of the tubing connected to the heat exchanger 17, according to the specific installation of the fan unit.

The discharge of the treated air from the outlet apertures 11a and 12a occurs in a direction which can be controlled by the orientation of the grille 12b. In particular, when the vanes forming the grill 12b are parallel to those of the fixed grille 11, the air exits in a stream of constant width, as indicated diagrammatically in Fig. 3.

When the vanes forming the grille 12b are directed so as to deflect air away from the fixed grille 11b the air exits in a stream of increasing width, as indicated in Fig. 2. In particular, the air leaving the aperture 12a, which has a velocity greater than that of the air leaving the aperture 11a causes parts of the air stream leaving the aperture 11a to be drawn towards it by virtue of the so-called "Coanda" effect. As a result the combined stream of air has a uniform distribution, as is seen in Fig. 2, of wide fan shape and low velocity, so as to improve the comfort for users.

When, on the other hand, the grille 12b is orientated so as to deflect air towards the fixed grille 11b, the air exits in a stream which, at least close to the outlet apertures 11a and 12a, is of narrowing width, as illustrated in Fig. 4; this effect is desirable to achieve a high penetration of the air stream into the ambient air space so as to promote circulatory flow of the air over the boundary surface of a room.

The main advantage of the convector fan unit according to the present invention lies in its considerable compactness, achieved by virtue of the particular arrangement and structure of the partition 15 between the heat

exchanger 17 and the fan 20. The partition 15 serves both to reinforce and brace the housing and includes within itself the collecting trough 16 for the condensed water and a part of the fan 20 itself.

A further advantage of the convector fan unit 1 according to the invention lies in the ease with which maintenance can be carried out particularly the inspection and cleaning of the fan 20. Only a portion of the fan volute is in fact removable, while the remaining part remains fixed *in situ*.

Furthermore, the convector fan unit 1 is easier to install than conventional fan units, in any one of the various desired positions in an environment, through the possibility of placing the control box 13 within arm's reach, for example by removing the control box from its recess and by effecting the necessary pipe-work connections for heat exchange fluid in any desired direction.

Finally the convector fan unit according to the invention is structurally strong by virtue of its stiffening reinforcement by the partition.

The fan unit is also particularly well suited to be installed in harmony with the furnishing and decor of the environment for which it is destined, by virtue of the facility with which its side walls and its front wall may be interchanged with others, of selected design or colour, or personalised by the application of suitable coatings and/or colours.

Finally the convector fan unit according to the invention offers users greater comfort due to the possibility of obtaining a flow of treated air which is adjustable with continuity between a wide fan shaped stream and a jet of air.

105 CLAIMS

1. A convector fan unit for treating air in domestic, office and like environments, comprising a housing containing a heat exchanger and a fan, and a structurally reinforcing partition within the housing between the heat exchanger and the fan, the surface of the partition facing the heat exchanger being formed with a trough for collecting condensed water from the heat exchanger when the housing is upright, and the opposite side of the partition having an arcuate shaped portion forming part of a volute of the fan, said partition further defining the delivery outlet of the fan.

2. A fan unit according to Claim 1, in which the fan is fixed to the underside of the partition.

3. A fan unit according to Claim 1 or Claim 2, in which the fan volute has a removable portion adjacent the front of the housing.

4. A fan unit according to any one of Claims 1 to 3, in which the partition has at least two through holes for accommodating connectors or pipework associated with the

heat exchanger.

5. A fan unit according to any one of the preceding claims, in which the housing is provided with two air outlet apertures arranged side-by-side and provided respectively with a fixed grille and with a flow-directing grille which can be adjusted to vary the direction of the air stream discharged through said grille.
- 10 6. A fan unit according to any one of the preceding claims, including a control box releasably mounted in a recess in the housing structure.
- 15 7. A convector fan unit substantially as herein described with reference to and as shown in the accompanying drawings.

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